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The Composition of Florida Citrus Molasses...

J. ROYO IRANZO AND M. K. VELDHUIS, U. S. CITRUS PRODUCTS STATION, WINTER HAVEN, FLORIDA

Condensed From Paper At Meeting Florida State Horticultural Society

Citrus molasses is a comparatively new product. Although information has been available on the composition of the press juice from which it is made, little has been published on the composition of the molasses itself. It is the purpose of this paper to present data obtained in chemical analyses of 13 samples of citrus molasses.

Citrus molasses is produced from the waste peel, rag, and seeds from the citrus canneries. The waste is first ground with a hammer mill into pieces about a quarter of an inch in diameter. Lime is added to neutralize the acidity, react with the pectin, and facilitate pressing and drying. The ground peel is passed through a pug mill in which it is kept in constant agitation for about 10 minutes or is placed in bins for 30 to 45 minutes to permit the lime to react. In areas where fuel is cheap the peel may be passed directly to the driers. In Florida where fuel costs are an important factor, as much of the liquid as possible is first removed by pressing and the pulp then passed to steam-heated or direct-fired rotary driers. The removed liquid, or press juice, is concentrated in multiple-effect evaporators, having two, three, or four effects and sometimes having a finishing pan. The juice has originally a soluble solids content of from 6 to 11 per cent, depending on the nature of the fruit and method of handling the peel. For instance, the value will be lower if water has been used instead of dry lime. In the evaporators the soluble solids content is increased to about 73 per cent. The temperatures used range from 245° to 135° F. and naturally vary with the type and the number of effects.

Both the dried pulp and molasses are used extensively as feeds. Citrus molasses is also used in the production of alcohol (12). Several studies have been reported on the feeding value and chemical composition of dried citrus pulp (1, 5, 6, 7, 8, 9, 10, 12, 13). Becker, Arnold, Davis and Fouts (3 and 4) estimated 1.4 per cent digestible crude protein and 56.7 per cent total digestible nutrients in citrus molasses, based on 69.9 per cent dry matter. These authors also reported 3 to 5 per cent each of crude protein and ash and the absence of crude fiber. The manufacture of dried pulp and molasses provides a complete answer to the disposal problem of citrus peel in that all the organic matter is retained and converted to useful products.

Table I gives information on the production in Florida of dried citrus feed and molasses. It will be noted that the ratio of citrus molasses has been steadily increasing. In general, the mills have been equipped first for the production of dried pulp and the molasses units have been added later. A few mills still have no evaporators and the press juice is discarded.. .

EXPERIMENTAL

Samples of freshly manufactured citrus molasses were collected at intervals from the early part to well past the middle of the 1947-48 citrus canning season from eight feed and molasses plants in Florida. The samples were transported directly to the laboratory, being placed in a refrigerator at 35° F. within 3 days of manufacture. Portions were drawn from cold storage as needed for analysis, not more than two samples were taken from a single evaporator.

Official methods of analyses (2) were used in the determination of total solids, crude protein (N x 6.25, pectin (alcohol precipitate), ash, total acidity (calculated as citric acid), volatile acidity (calculated as acetic acid), calcium in ash, and magnesium in ash. Total sugars, non-reducing sugars, and reducing sugars were determined by the Munson-Walker gravimetric method and all reported as invert sugars. Overnight acid inversion was used. pH was determined with a glass electrode; degrees Brix with an Abbe type refractometer and by diluting with an equal weight of water and determining density with a spindle; color by comparison with Maerz and Paul color charts; and viscosity with a Stormer viscosimeter standardized with a Bureau of Standards reference fluid having a viscosity of 1282 centipoises.

RESULTS

Samples Nos. 1, 4, 5, 6, 10, 11, and 12 were from plants with quadruple-effect evaporators having finishing pans; samples Nos. 2, 3, 7, 9, and 13 were from plants with triple-effect evaporators; and sample No. 8 was from a plant with a two-stage evapora-

(Continued on page 15)

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The Relationship of Timing Post-Bloom Spray to Certain Fruit Blemishes on Oranges

W. L. Thompson, Entomologist, Florida Citrus Experiment Station

The reasons for spraying citrus trees are to produce a crop of fruit as free of blemishes as possible and to keep the trees reasonably free of injurious insects, mites, and diseases. In order to produce a high percentage of No. 1 grade fruit the proper timing of the applications is almost as important as the selection of the proper insecticides and fungicides. The type of materials used and the cost of application may be equal in two spray programs, but a well timed program may result in 20 to 50 percent more No. 1 grade fruit than a poorly timed program. In the post-bloom sprays the most common insecticides are sulfur and oil emulsions, while copper compounds are used for disease control and nutritional purposes. Usually it is practical as well as economical to combine two or more materials in one spray and the most common post-bloom combinations are: (1) a proprietary copper compound with wettable sulfur for the control of melanose and rust mites, or (2) a proprietary copper compound combined with an oil emulsion to control melanose, scale insects, and purple mites. These two spray combinations may be very effective, but if the timing of the application is disregarded a high percentage of the mature fruit may be marked with blemishes.

With the exception of mechanical injury (wind scar), the blemishes caused by rust mite and melanose are the major natural grade lowering factors in Florida. To produce a crop of oranges free of these blemishes, it is necessary to apply the insecticide and fungicide before any injury has developed. Since melanose can infect the fruit as soon as it has set and rust mites may infest very young fruit, it is important to apply the post-bloom spray as soon as possible after the petals have dropped. In the post-bloom timing experiments for the control of scales, rust mites and purple mites copper compounds have been included in the sprays for melanose control. Where the copper was included in the sprays, there were fewer melanose lesions on the mature fruit where the sprays were applied during the first two to three weeks after the petals fell than where the sprays were delayed.

Sprays containing sulfur, oil emulsions and copper compounds are not usually considered as being particularly injurious to the fruit and blemishes caused by the spray materials were of no importance on fruit sprayed within two weeks after the petal fall, but further delay in applications resulted in more and more injury as the time interval increased after the fruit had set. In considering all blemishes, in four out of five years, the highest percentage of No. 1 grade fruit was produced in plots sprayed within two weeks after the petals had dropped, Table 1.

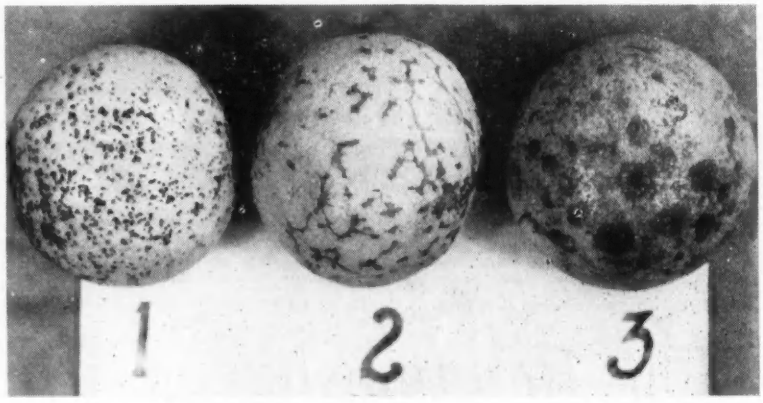
Three types of injury may be caused by delaying post-bloom sprays. They are: star melanose, a copper-mechanical injury, and oil blotch. In this article the blemishes caused by the post-bloom application of insecticides and fungicides will be discussed.

Star Melanose.—Star melanose is a raised lesion on the fruit and leaves which is often angular or star-like in shape. The center lesion and those branching from the center are sometimes split or cracked which makes the fruit

quite rough. The lesions are raised more than the usual melanose lesions and are dark brown to black in color, Fig. A, 1 and Fig. B. Since the star melanose lesions are dark in color and more raised than the common melanose lesions, the blemish is more of a grade lowering factor than the common melanose.

Star melanose has been associated with copper sprays for many years. Winston, Bowman and Bach (2) associated star melanose with bordeaux sprays and bordeaux oil emulsions. However, the timing of copper sprays had not been associated with the presence of star melanose. In more recent work Thompson (1) found that a very small percentage of fruits were marked as a result of spray materials where the applications were made before they reached 3/4 inch in diameter. R. K. Voorhees[1] was of the opinion that the copper aggravated the corky tissue caused by melanose. In 1947, R. W. Jones[2] proved rather conclusively that a copper spray did aggravate the corky tissue caused by melanose infection. Where all plots were sprayed with copper on the same day, star melanose was abundant on mature fruit that was infected with melanose before the application, but it did not develop to any extent on fruit that was comparatively free of melanose when the application was made. Therefore it may be concluded that the reason star melanose has been more prevalent on fruit from trees sprayed three to seven weeks after the petal fall was because the fruit had been infected with melanose before it was sprayed.

Fig. A.
Blemishes Caused by Post-bloom Sprays



No. 1. Star melanose.
No. 2. Copper-mechanical injury.
No. 3. Oil blotch.

Table 2 shows the relationship between star melanose on mature fruit and the incidence of melanose at the time the copper spray was applied. Thus, the amount of melanose infected fruit is correlated with the amount of star melanose. Even though a high percentage of the fruit was infected by April 1 the infection was slight, and as the young fruit grew, the lesions become farther apart and were of little significance as a grade lowering factor. As the season progressed the percentage of infected fruit increased in the non-treated plots and this resulted in grade lowering factors in the form of melanose and star melanose when the crop was harvested. After the April 1 spray the total amount of fruit affected with melanose and star melanose was of economic im-

Table 1.

The Relationship of Timing Post-Bloom Copper-Oil Emulsion Sprays to Fruit Blemishes.

Periods of Spray Dates	Treatment Weeks after Petal Drop	Fruit Size in Diameter at Time of Application	Percent No. 1 Grade	Blemishes caused by Copper-Oil. Recorded According to Severity
1944				
April 6	2	90% ¼" to ½"	64	Copper injury [1]
April 20	4	71% ½" to 1"	51	Oil blotch, star melanose, copper injury
May 19	8	68% 3/4" to 1¼"	62	Star melanose, copper injury, oil blotch
1945				
March 26	1	91% 1/8" to ½"	49	Slight copper injury
April 24	4	79% 3/4" to 1¼"	35	Oil blotch, star melanose
May 16	7	90% 1" to 1½"	34	Star melanose, copper injury, oil blotch
1946				
March 20	1	86% 1/8" to ¼"	64	No spray injury
April 11	3	100% 1/8" to ½"	68	No spray injury
May 3	6	86% ½" to 1"	58	Oil blotch, copper injury
May 27	9	54% 1¼" to 1½"	31	Star melanose, copper injury, oil blotch
June 14	12	100% 1½" to 2+"	26	Star melanose, copper injury
1947				
April 18	1	100% 1/8" to ¼"	58	Slight copper injury
May 2	2	100% 1/8" to ¼"	46	Slight copper injury
May 15	4	71% ½" to 1"	29	Oil blotch, star melanose, copper injury
June 10	7	90% ½" to 1¼"	19	Star melanose, copper injury
1948				
March 17	1	100% 1/8" to ¼"	68	No spray blemish
April 1	2	90% ¼" to 3/4"	42	Oil blotch, copper injury
April 16	4	76% ½" to 1"	16	Oil blotch, star melanose, copper injury
May 6	6	90% 1" to 2"	15	Star melanose, oil blotch, copper injury
May 28	9	91% 1¼" to 2+"	13	Star melanose, copper injury

[1]Copper injury = Copper mechanical injury. Fig. A No. 2
All blemishes were recorded after the fruit had matured.

portance, especially where the sprays were delayed until May 1 or later. It is interesting to note that when the May 28 application was made, the total amount of fruit infected with melanose and star melanose was about equal to the amount of melanose infected fruit in the untreated check. The high percentage of star melanose made the appearance of the fruit, in the May 28 sprayed plot, look much more unsightly than the fruit in the untreated plot.

Either copper-wettable sulfur or copper-oil emulsion sprays caused star melanose. However, the copper-oil emulsions have caused the more severe blemishes. Where copper-oil emulsion sprays are needed they should be applied within two weeks or at the most three weeks after the petals have dropped.

Other Copper Injuries.— Copper sprays, especially copper-oil emulsions appear to aggravate any scar which may be on the fruit when it is sprayed. The injury caused by rust mites (early rust mite injury) became rougher and dark brown to black in color where copper-oil sprays were applied after the injury had developed. And as with star melanose, compared with melanose, the blemish caused by the combination of early rust mite injury and copper-oil emulsion injury was more unsightly than the common early rust mite injury.

Mechanical injuries or wind scars, which are caused by leaves and twigs rubbing against the young fruits, were also darker in color and raised at the margins of the scars where late applications of copper-oil emulsions were made.

Copper - Mechanical Injury. Another injury which apparently is caused, in part, by copper sprays resembles a mechanical injury, Fig. A,2. This injury is in the form of a narrow, irregular scar which may be caused by a combination of the force of the spray on the fruit and a certain toxic effect of the copper compound in the spray. The copper-mechanical injury has been more

Fig. B. Star Melanose (Enlarged)

prevalent where copper-oil emulsions were used than with copper-wettable sulfurs, but it is common following delayed sprays of either combination. No similar markings were observed where oil emulsion sprays were applied on the same days as the copper-oil emulsions. See Table 3. The most severe marking resulted from a combination of compounds of a neutral zinc and neutral copper combined with an oil emulsion. As with other post-bloom copper sprays, the highest percentage of marked fruit was from plots sprayed four to eight weeks after the fruit had set. This type of blemish was not observed where sulfur-copper dusts were applied. An occasional injury similar to the copper-mechanical injuries has been observed where a wettable sulfur application had been made.

Oil Blotch. — Oil blotch on oranges is caused by an oil emulsion spray when the fruit is at a certain stage of growth. The blotch is more or less round in shape, varying from a light brown to dark brown in color and the injury is of a superficial nature, but it is a definite blemish. Figure A,3. This injury usually occurs on the stylar end, but it may be found anywhere on the fruit surface. The injury should not be confused with the uniform brown russeting on the stylar end of the fruit which is a result of early mite infestations.

The abundance of oil spot on oranges varies from year to year, but fruit size at the time of application appears to be a determining factor. The cause of oil spot has been considered for the past eight years. On May 23, 1941, several plots of Pineapple oranges were sprayed with various copper compounds combined with an oil emulsion. At the time of the application the size of the fruit probably ranged from 3/4 inch to 1 1/4 inches in diameter. When the fruit was harvested in the fall, a high percentage of the crop was marked in every plot that had been sprayed with an oil emulsion. The percentage of fruit marked from four representative plots was as follows: oil emulsion 44 percent, basic copper-oil emulsion 34 percent, bordeaux-oil emulsion 57 percent, and basic copper-wettable sulfur 1 percent. In subsequent experiments, conducted from 1944 to 1948, the results indicate that oil blotch developed where the trees were sprayed when the fruits were between 3/4 inch and 1½ inches in diameter. Since the fruits on an individual tree may vary from 3/4 inch to 1½ inches in size at a particular time, no definite size has been determined when the injury is most likely to develop, but in no instance has oil blotch developed where the majority of the young fruits ranged in size from 1/8 inch to ½ inch in diameter when the application was made. In Table 1 is recorded the presence of oil blotch on fruit where copper-oil emulsions were applied when the fruit size varied. In Table 3 the percentage of oil blotch is recorded for the season of 1948.

It is recommended that fruit size should be used as a guide as to when it is advisable to use any

Table 2.

Relationship of Melanose Infection on Young Fruit to Melanose and Star Melanose Lesions on Mature Fruit.

Dates of Copper-Oil Sprays 1948	Percent Fruit Infected with Melanose at Time of Application[1]	Percent of Mature Fruit Commercially Affected		
		Melanose	Star[2] Melanose	Total Melanose
March 17	No record	0	0	0
April 1	58	0	1	1
April 16	77	2	5	7
May 2	84	6	9	15
May 28	89	6	39	45
Oil spray only May 28	No record	37	0	37

[1] Fruit with one melanose lesion was considered infected when the inspection was made in the spring. On mature fruit lesions were considered when they were abundant enough to lower the grade.

[2] Star melanose was a result of a copper-oil emulsion spray on melanose lesions.

spray containing an oil emulsion. Definite dates should not be depended upon as a guide for spraying oil emulsion. In 1947, a late bloom year, no oil blotch developed on fruit sprayed on April 18 or May 2, but it was severe in plots sprayed May 15. In 1948

Fig. C. Melanose (Enlarged)

an early bloom year, oil blotch developed on plots sprayed April 1 and severe injury developed where the spray was applied on April 16. See Table 1.

Oil blotch appears to be definitely an oil injury and not the result of a combination of a copper-oil emulsion. Except where a bordeaux oil emulsion was used, there has been equally as much marked fruit each year where copper was omitted in the post-bloom oil emulsion spray is with the copper-oil emulsion combinations.

There has been no correlation between the abundance of oil blotch and the different types of copper-oil emulsions. In 1947 comparisons were made with four different proprietary copper-oil emulsions and a proprietary copper combined with a tank mixed oil emulsion. Little or no injury developed on plots sprayed April 18 and May 2, respectively, but severe blotching developed in all plots sprayed May 15. There has been no difference in the amount of marking where the oil concentration was used at 1% actual oil and at 1.3% actual oil. However, where wettable sulfur was added to a proprietary copper-oil emulsion there was excessive injury similar to oil blotch except that it was a slightly deeper burn. Sulfur-oil injury developed regardless of the size of fruit when the application was made.

Discussion

Results of experimental work strongly indicate that the proper timing of post-bloom sprays is important from the standpoint of producing a high percentage of a No. 1 grade of fruit. Factors involved are, the prevention of the mite, insect, and disease blemishes and injury caused by the insecticides and fungicides. As stated previously, the highest percentage of No. 1 grade of fruit was produced where the combination fungicide and insecticide sprays were applied immediately after the petals had dropped. Where sprays were applied at that time little or no melanose infection had taken place, early rust mite injury had not developed and the young fruits were not in a stage of growth to be easily injured by the sprays. As the season progressed some melanose infection took place, rust mite in-

(Continued on Page 18)

Table 3.
Percent No. 1 Grade Fruit and Blemishes on Oranges Caused by Post-Bloom Copper Sprays.

Materials	100% Fruit 1/8"-¼"[1]		Sprayed April 1				Sprayed April 16				Sprayed May 6				Sprayed May 28			
	Sprayed Mar. 17		90% of Fruit ¼"-3/4"				76% of Fruit ½"-1"				90% of Fruit 1"-2"				91% of Fruit 1¼"-2+"			
	No. 1 Grade[2]	Copper Injury[3]	No. 1 Grade	Copper Injury	Star Melanose	Oil Burn	No. 1 Grade	Copper Injury	Star Melanose	Oil Burn	No. 1 Grade	Copper Injury	Star Melanose	Oil Burn	No. 1 Grade	Copper Injury	Star Melanose	
Dormant copper-wettable sulfur Post-bloom copper-oil emulsion	74	0	54	5	1	6	29	3	3	24	32	5	10	6	48	8	17	
Dormant copper-wettable sulfur Post-bloom oil emulsion	70	0	52	0	0	9	29	0	0	31	42	0	0	5	48	0	0	
Post-bloom copper-oil emulsion	68	0	42	4	1	11	16	3	3	21	15	2	19	9	13	7	39	
Post-bloom copper-wettable sulfur	55	2	38	2	0	0	45	1	4	0	23	1	10	0	31	3	18	
1st Post-bloom copper-w. sulfur (Mar. 17) 2nd Post-bloom copper-w. sulfur (See Headings)							36	4	1	0					49	2	1	
1st Post-bloom copper-w. sulfur (Mar. 17) 2nd Post-bloom copper-oil emulsion (See Headings)							17	3	3	29					38	14	9	
No treatment															1	0	0	
No treatment															18	0	0	

1 Fruit size = diameter of the fruit
2 No. 1 grade = A strict U. S. No. 1 grade
3 Copper injury = copper-mechanical injury. Fig. A No. 2

Citrus Insect Control Problems For The Spring Of 1949

J. T. Griffiths, Jr.[1] and W. L. Thompson[2]

Florida Citrus Experiment Station, Lake Alfred, Florida

A month ago we offered the suggestion that purple scale infestations would be severe during the 1949 season and that growers should begin to plan their scale control program now. The following is a resume of the need for adequate scale control and suggestions as to alternative programs.

Counts made at the Citrus Experiment Station have indicated that in many places purple scales have increased more than 100 percent since last November. During February and early March the first generation of scale crawlers emerged, and these individuals are now approaching the time when they will begin to lay eggs and a second generation will be on its way. Second generation scale did not appear until mid-May last year, but they will begin to hatch in early April this year. In addition, checks in groves which have been watched for over three years showed higher populations this spring than in either 1947 or 1948 and both were bad scale years. These three facts, increases during the winter, an extra generation already, and higher populations than usual this spring dictate the necessity for carefully planned and executed scale control programs. The need for this has been well substantiated by checking commercial groves with owners and production managers. Purple scales are very common, and in many groves they are actually killing wood at the present time.

Bloom is appearing in many groves, but everything points to an irregular fruit set this year. Sprays for melanose control will be scattered over a prolonged period of time. This somewhat complicates planning, but it also relieves the grower of the urgency ordinarily encountered when his entire acreage blooms all at one time. It may be possible to time copper-oil sprays so as to get a favorable time in each grove.

All recommendations for oil sprays are contingent upon the premise that the grove to be sprayed is not suffering from drought. From this standpoint, it is desirable to time irrigations so as to immediately precede an oil application. **Do not spray oil where there is any indication of wilt or injury may be severe.**

Where moisture is adequate, straight oil sprays may be applied at any time. No damage has been observed when oil was sprayed into the bloom. Therefore, if the grower does not need copper for melanose control and the moisture is all right, he may use oil as soon as practicable.

Copper-oil should be applied within two weeks from the time that petals fall. Copper injury may be severe if sprays are delayed too long. (See page 5 in this issue for further information.) It is preferable to apply the copper-oil spray as soon as possible after two-thirds of the petals are on the ground. This time will vary in individual groves, and this year it may allow the grower to spread his copper-oil spraying over more than a couple of weeks.

Purple Mites.—Numerous calls have been received regarding purple mite control during the past two weeks. The cool nights and warm days during March have been favorable to mite development. Where no new growth has appeared, DN-sulfur sprays may be used. If growth has started and temperatures remain below 88°, DN sulfur dust should be substituted for the spray. The dust is less apt to injure young foilage or fruit than the spray. In fact, economic injury has never been observed following dust where temperatures were not above 88°. DN dusts or sprays may be applied regardless of moisture conditions in the grove.

Oil or copper-oil may be substituted for DN, but should be applied only when soil moisture is adequate and according to the directions outlined in the paragraphs above under scale control.

Grasshoppers. — A grasshopper survey has just been completed by the State Plant Board* in the areas of Hillsborough, Polk and Hardee counties which have been infested with grasshoppers for the past three years. In general, the findings were the same as they were a year ago. Infestation in groveland is spotted, but heavy on occasion. As yet, no hatch of young bird grasshoppers has been observed. However, it is to be expected that they will begin to hatch shortly. In groves where grasshoppers are expected, clean cultivation should be maintained. If this has not been accomplished, disc the groves as soon as possible. Insecticides are not recommended until such time as the bulk of the young hoppers have hatched. As they begin to approach an inch in length it will be noticed that they will move from cover crop to trees and begin to do damage. It is just prior to this time that the use of insecticides will be most beneficial. No definite date can be set for this period as yet, but it appears that it will probably occur around the 1st of May. In bearing groves use 5 percent chlordane dust at 30 pounds per acre or 10 percent toxaphene dust at 40 pounds per acre. Sprays may be substituted and should be used at 1½ to 2 pounds of actual chlordane or 3½ to 4½ pounds of actual toxaphene per acre.

Clean cultivation is of utmost importance and should be maintained through May.

Aphids.—Aphids require young foliage for growth and reproduction. With dry weather spring growth has been very irregular in most groves. There are lots of new leaves in many groves now and growth will continue in others for some time to come. It is to be expected that many of the late growing groves will be badly affected with aphid injury unless proper control measures are taken. This will be expected to be true

(Continued on Page 17)

1 Associate Entomologist
2 Entomologist

* The authors wish to thank Mr. A. C. Brown, Plant Commissioner, Mr. H. S. McClanahan and Mr. George F. Burden and his grove inspection crew for their part in making this survey possible.

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Never before in the hsitory of the Florida citrus industry has there been such unity of purpose among all elements of the industry as has been achieved in the organization of Florida Citrus Mutual. True, there have been differences of opinion as to the set-up of the organization, but these differences have been reconciled, the efforts of the promoters have been consolidated, the super-cooperative has been formed and is now prepared to function.

With more than eighty percent of the tonnage signed, the organization is in position to act with authority in controlling distrbuton and through that control to bring about an adjustment of price which will guarantee the growers of a profit on their investment and labor.

Looking back to the losses of the past two seasons due to disorganized marketing conditions, it is unthinkable that Florida citrus growers should fail to make the most of this opportunity to present a solid front in support of this great organization conceived and perfected to meet the needs of a great industry.

A glance at the list of directors, every one a leader in his own community, a study of the officers chosen to direct the operations of the Mutual, all men of recognized ability, should be enough to satisfy every grower that the affairs of the organization will be carried on in the best interests of the industry. Florida Citrus Mutual is off to a good start; if given the support and encouragement to which it is entitled it should mean millions of dollars in extra profits to the growers of Florida citrus fruits. Let's see that such support is forthcoming.

THE TEXAS FREEZE

Elsewhere in this issue will be found a survey of the recent freeze in the Lower Rio Grande Valley of Texas, reprinted from Texas Farming and Citriculture.

This survey, carried on by some of the leading citrus experts of that state, indicates that the industry in Texas has been damaged to a far greater extent than may at first have been thought. Not only has there been a disastrous loss in fruit, but the injury to trees has been of vastly greater injury to the industry. Thousands of young trees have been completely killed, or damaged beyond hope of recovery. Older trees, too, have suffered injury from which it will require years for complete recovery. Suitable nursery stock for replanting is said to be limited to an appreciable degree.

The conclusion of the experts making the survey is that many years will be required to put the industry in the valley back to the position it occupied before the freeze. That it has been a serious set-back to citrus growers of Texas, there can be no doubt. The citrus growers of Texas, have the sympathetic consideration of those Florida old timers whose memories go back to the year of the "big freeze" in this state, when the industry here was so nearly wiped out.

"CALIFORNIA HERE WE COME"

First shipments of Florida citrus fruits to California since the partial lifting of the ban on Florida fruit by that state went forward by truck from a Lake Alfred packing house last week. Operating on a twenty-four hour schedule, with numerous changes of drivers enroute, the fruit is expected to reach San Francisco in five days, as against ten days required for shipment by rail.

These first shipments are in the nature of an experiment, and should the test shipments prove successful and profitable, greater shipments are expected to follow. The transportation cost to San Francisco is $2.75 per box. With the FOB price ranging from $2.50 to $3.00 per box, this would bring the delivered price at destination to around $5.25 to $5.75 per box.

Florida growers and shippers will watch with interest the returns from these initial shipments. Should the test shipments prove successful, a new outlet for the remainder of this season's crop will have been established.

CONTENDING AGAINST NATURE

Citrus growers in every American citrus growing section have been contending against discouraging elements this season. The season got off to a bad start with fruit selling at less than cost of production. Then came the freezes, first in California and then in Texas, destroying much of the crop on the trees and seriously damaging the trees in some sections. Here in Florida we have been faced with an almost unprecedented drouth, causing much droppage of fruit, both of the old crop and of newly set fruit and bloom. Unless rain should come soon, the loss to the new crop will be severe, particularly in those sections of the "belt" which produce the major tonnage of the Florida citrus yield.

Recent Development In Florida Peach Production....

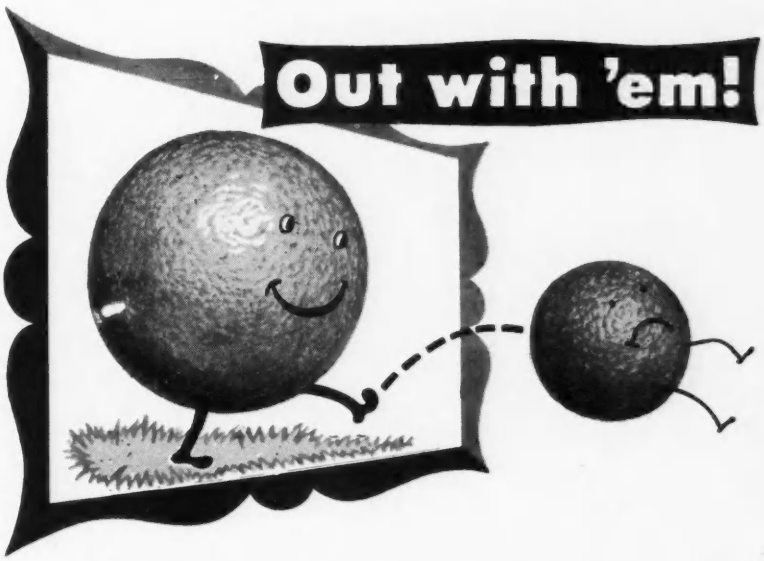
(Concluded From Last Issue)

Following the results obtained at Whitney in 1947, an experiment with Jewel peaches was set up on the Experiment Station's farm at Gainesville. In this test the treatments include DD, chloropicrin, ethylene dibromide (Dowfume W-40) and check. The treatments were replicated 8 times and each plot divided so that half of the trees received a mulch and half were left unmulched. The land was staked off in the usual manner to establish the exact location where each tree was to be planted. The chemicals were applied in a square 9 x 9 feet, at the rate of two cc per square foot, with the tree location in the center of this area. In 1948 the mulch material was blue lupine applied about the trees in a 3-foot circle, 8 inches deep, early in the spring.

At the end of the first year the average growth of the trees as measured by cross-sectional area of the trunk has been better where the trees were mulched (Table 1). Also, the average effect of soil fumigation was to produce better trees than the check (Table 1). However, the significant interaction of soil treatment with mulch indicates that there is a differential response under the two conditions of mulch. An examination of Table 1 shows that chloropicrin is the superior treatment under the condition of no mulch but it is not benefited by mulching as are the other treatments. When a mulch was employed DD and Dowfume W-40 were the superior treatments.

From these preliminary results it would seem that it will prove of great value in obtaining growth if the soil around young trees is covered with a mulch of some organic material. This will prove helpful in reducing the injury from nematodes and, especially if used in connection with an acceptable soil fumigant it should be possible to grow peaches on lands heavily infested with nematodes such as those used in these tests.

It might at first appear to be a difficult task to mulch trees where there are several acres involved. It is not such a big job to do this if proper provisions are made for obtaining the materials for the mulch. Covercrops are valuable on the land and these can be utilized to supply enough material to cover the soil about the trees. Crotalaria, indigo, lupine and other legumes, as well as non-legumes such as all kinds of weeds and grasses, can be grown between the tree rows and the growth used for mulching the soil about the trees. The easiest way to handle this growth is to cut the material and rake it up toward the tree rows in windrows where it can be readily placed about the trees with pitch forks.



Undersized fruit is costly! It can't be shipped! NOW is the time — not later than mid-June — to make additional plant food available for proper sizing of fruit. You can now figure your fertilizer requirements to properly size fruit. Get the most from your crop. Increase your profits by using X-CEL quality fertilizer NOW.

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If dry weather caused poor setting of fruit, it is essential to fertilize in late April or early May, when moisture conditions warrant, for a May bloom.

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It is not necessary to pack the material after it is placed as it will settle in a short time and produce the desired results. It would be advisable to do this mulching each year, as it is necessary for the soil to be kept covered for the mulch to be effective in promoting healthy tree growth. The material can be placed about the trees at any time when available but, for newly planted trees, the mulch should be applied early in the spring by the time growth starts.

Any one of the chemicals under test can be used for treating the soil prior to planting but the cost of DD and ethylene dibromide is much less than that of chloropicrin. Chloropicrin has some fungicidal value that the other two do not have but the cost is several times that of the others. The chemicals can be applied at the locations where the trees are to be set with a hand applicator or they can be injected with a machine applicator, treating the entire row, or the whole area where the orchard is to be planted. The cost per acre for broadcast application where the entire orchard location is to be treated will vary with the amount of land to be fumigated. Commercial operators do the work under contract at so much per acre of actual area treated.

With soil fumigation treatments it would seem that it should be possible to grow peaches on lands that have been in cultivation long enough to become heavily infested with nematodes. However, it is recommended that an organic mulch be applied on the soil about the trees in connection with the use of soil fumigants as better tree growth is being obtained in experiments where mulches have been applied. Mulching materials can be produced in the orchard by growing either natural vegetation or planted cover-crops.

ACKNOWLEDGEMENTS: The authors wish to express their thanks to Dr. G. K. Parris and Mr. L. H. Stover, who looked after the experiment at Whitney; and to Mr. R. P. Thornton, who contributed the peach trees for the experiments.

TABLE 1.—EFFECT OF MULCH AND SOIL FUMIGATION TREATMENTS ON JEWEL PEACH TREES AT END OF FIRST GROWING SEASON, GAINESVILLE, FLORIDA.

Treatment	Cross-sectional Area of Tree Trunk in Square Inches		
	Mulched Average of 8 trees	No Mulch Average of 8 trees	Average of Mulched & Non-Mulched trees
Check	0.97	0.47	0.72
DD	1.50	0.63	1.06
Chloropicrin	1.12	1.02	1.07
Dowfume W-40	1.65	0.73	1.19

Least significant difference at 5% level for comparing fumigation treatments under each mulch treatment—0.45.
Least significant difference at 5% level for comparing mulch vs. no mulch for each fumigation treatment—0.39.

FALL DATE IS SET FOR EXTENTION CONFERENCE

The 1949 conference of county and home demonstration agents and other workers of the Florida Agricultural Extention Service will be held in Gainesville October 17-22, Director H. G. Clayton announced recently.

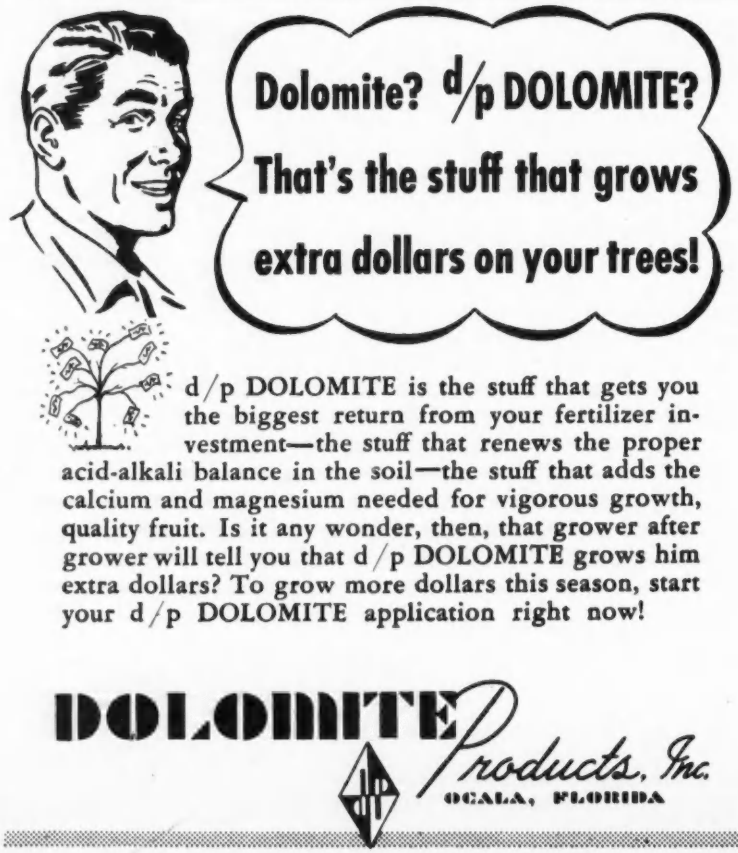
The confereence is an annual affair for the purpose of giving Extention workers an opportunity to discuss agricultural and rural homemaking problems and to obtain the latest results of research in agriculture.

STATE HORTICULTURAL SOCIETY PLANS TAMPA MEETING NOVEMBER 1

The State Horticultural Society sessions for 1949 will be held in Tampa November 1-3, according to a receent decision by the directors.

Dr. Ralph L. Miller, secretary, announced from Plymouth recently that Hotels Hillsboro and Tampa would be headquarters, and that an outstanding program will be arranged well in advance of the session.

A new 4-H club for girls has been organized at Lakeview high school in Winter Garden, according to Miss Sammie Killgore, assistant Orange County home demonstration agent. Officers of the club are June Tubb, president, Nan Paul, vice-president, Shirley Prince, secretary-treasurer, Glenda Scroggins, reporter, and Ann Arnold, council delegate.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d/p DOLOMITE is the stuff that gets you the biggest return from your fertilizer investment—the stuff that renews the proper acid-alkali balance in the soil—the stuff that adds the calcium and magnesium needed for vigorous growth, quality fruit. Is it any wonder, then, that grower after grower will tell you that d/p DOLOMITE grows him extra dollars? To grow more dollars this season, start your d/p DOLOMITE application right now!
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Every Grower Will Admit That The Outlook Is Brighter

Today than it was a couple of months ago . . . . prices are decidedly more attractive and the outlook for the coming season is better than we could have hoped for sixty or ninety days ago . . . . so it behooves every grower to put his trees and his crops in the best possible condition.

The extended dry spell has tended to deplete the vigor of many groves, so it is essential that the spring application of fertilizer be applied as early as possible both for the benefit of the crops still on the trees . . . . in order to stimulate trees with proper strength to hold the new bloom and to generally invigorate the groves to withstand possible ravages of pests and weather.

For many, many years Florida Favorite Fertilizers have served the citrus growers throughout the entire citrus belt of Florida with satisfying results to our hundreds of customers . . . . indeed, our outstanding production achievements for customers keep our old customers more than satisfied and are constantly bringing us new ones.

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The Use of Deflocculators When Combining Neutral Proprietary Copper Compounds With Oil Sprays . . .

Charles R. Stearns, Jr., Associate Chemist—Insecticides
Florida Citrus Experiment Station, Lake Alfred, Florida

The use of copper compounds in combination with oil as a post-bloom spray for controlling melanose and for reducing the scale insect population has become popular in recent years, particularly in groves having a heavy carry-over of scale. This combination spray can be used in two ways: either by using a proprietary copper-oil emulsion, or by adding neutral propietary copper compounds to oil emulsions or emulsifiable oils.

When neutral copper compounds are to be added to the oil, the manufacturer or dealer should be consulted as to which neutral copper compounds are compatible with the oil emulsion or emulsifiable oil in question. The copper in some combinations may be flocculated or clumped in flakes rather than dispersed in fine particles. This can result in unsatisfactory control of melanose. In some combinations the oil emulsion may be broken, causing the oil to separate rapidly in large globules rather than fine droplets. When the emulsion is broken severe damage may occur as well as unsatisfactory control of melanose and scale.

The spray mixture should be examined in a glass container before using, and should not be used if either of the conditions mentioned above exist. In order to overcome these difficulties a deflocculator recommended by the manufacturer of the oil emulsion or emulsifiable oil should be used. There are several deflocculators available. Soy bean flour, lignin sulfite pitch (a by-product from paper manufacture sold under the names of Bindex, Binderene, and Goulac) and some proprietary deflocculators have been tested and found satisfactory.

Soy bean flour may be used with oil emulsions and emulsifiable oils according to the following directions: ¼ lb. of soy bean flour is placed in a bucket and water slowly added while stirring until a thin paste is formed. After all lumps of flour disappear the copper material is slowly added and stirred until a smooth paste is formed. More water may be added if necessary. The oil emulsion or emulsifiable oil is diluted in the spray tanks in the usual way and the paste of flour and copper material is added when tank is 3/4 full. This mixture is based on 500 gallons of spray.

Lignin sulfite pitch may be used more satisfactorily with oil emulsions than with emulsifiable oils. Four to 6 ounces of lignin sulfite pitch is added to the spray tank containing from 100 to 150 gallons of water and the copper material added after the lignin sulfite pitch has dissolved. When the tank is 2/3 to 3/4 full the required amount of oil emulsion is added and the tank filled. The above amount of lignin sulfite pitch is sufficient for 500 gallons of spray material. The manufacturers of proprietary deflocculators should be consulted as to the proper amounts and methods of mixing their respective products.

If lead arsenates are going to be added to these copper and oil combination sprays, soy bean flour is not satisfactory in all spray waters, however, lignin sulfite pitch at the above mentioned amount will give satisfactory results. When emulsifiable oils are being used in this combination the lignin sulfite pitch should be added after the emulsifiable oil is added and the tank half filled. After the lignin sulfite pitch has dissolved, the neutral cpoper compound and the lead arsenate are added as the tank is finished being filled.

If lead arsenates are going to be added to the summer oil application and are not compatible, the same amounts of deflocculators may be used according to the directions as given above for the neutral copper compounds.

1949 FARM PROGRAM PROVISIONS IMPROVED

Gainesville, Fla. — Florida farmers will find the 1949 agricultural conservation program greatly improved in provisions and are reminded that they should at least find out what it has to offer before the April 15 closing date for filing intention to participate.

R. S. Dennis, executive officer with the Production and Marketing Administration, says the maximum payment limitation has been raised from $500 to $750 and other desirable provisions included.

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THE COMPOSITION OF FLORIDA CITRUS MOLASSES

(Continued from page 3)

tor in which the first effect was the direct-fired spray type and the second of conventional design. Sample No. 4 was made from orange peel only; all the others were made from a mixture of grapefruit and orange peel.

Concentration. The results permit a comparison of the degrees Brix as estimated by the refractometer, spindle and drying methods.

The refractometer method, the one most generally used, indicated concentrations from 64.44 to 74.52 degrees Brix, with an average value of 71.37. It is believed that the lower values were largely due to the method of sampling in that samples of fresh material were taken and lots were generally blended later to the desired strength.

The spindle method of estimating concentration provides a rapid procedure when a refractometer is not available. The molasses is too thick for a direct reading; so it is diluted with an equal weight of water, the density determined, corrections applied, and the result multiplied by two. The average value obtained was 72.28 degrees Brix, about 0.9 degrees higher than by the refractometer method.

In the third method of estimating concentration the samples were dried on pumice stone at 70° C. under vacuum. This method gave values averaging 70.43 per cent total solids, or about 1 per cent below those obtained with the refractometer. Any of the three methods of estimating concentration is suitable; but it should not be expected that identical values be obtained.

Sugars. The values for total sugars, reducing sugars and nonreducing sugars show some variations, but these are to be expected with this type of product. The sugars averaged 59.8 per cent of the total solids and ranged from 47.8 to 65.4 per cent. With 9 of the 13 samples the percentage of sugars in the total solids was within the range of 55 to 65 per cent. To obtain information on changes in sugars during concentration, 25 gallons of press juice were brought to the laboratory and concentrated under atmospheric

(Continued on page 18)

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The most practical and economical way to obtain quick-acting soluble magnesia is in combination with potash. *Sul-Po-Mag* is a natural combination of these essential plant food elements. It is mined and refined exclusively by International at Carlsbad, New Mexico.

It will pay you to ask your fertilizer manufacturer for *Sul-Po-Mag*. Write for a free copy of our booklet "Magnesium—an Essential Plant Food Element". It describes the function of magnesium in profitable plant growth.

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The Freeze Damage To Texas Citrus Groves . . .

From Texas Farming & Citriculture

Studies of the citrus loss in the Rio Grande Valley, due to the disastrous freeze at the end of January indicate that some twenty-five percent of the total crop was destroyed, about fifty percent having been harvested before the freeze. The money loss to the growers has been made heavier by the prices, below production costs, received for the fruit shipped to the fresh fruit markets or disposed of to the canners.

A freeze-damage committee of the Rio Grande Horticultural Club has investigated the extent of the damage and reported late in February that there was little difference in tree injury in various parts of the Valley where conditions were similar, that wherever the trees had put on a flush of new growth or were growing actively, the injury had been severe. Most trees from one to four years old were in an active state of growth. Virtually all of the one and two-year-old trees were killed to the bud union, and those which had been banked were killed to the bank, but were not injured more than a few inches below the soil. On three and four year old trees in active growth the bark and framework of the trunk were badly split, but the bark was alive and was healing rapidly.

Some eighty percent of trees from five to ten years old were growing actively, and branches smaller than an inch in diameter were largely killed. The twenty percent of inactive trees appeared to be little affected by the cold except for defoliation and light frosting of twigs. Most of the trees more than ten years old were inactive or were just beginning to grow their tops, where they suffered some slight damage, including defoliation.

Little difference in cold-resistance was shown between the varieties of grapefruit and oranges, although red grapefruit seemed to be somewhat less resistant than the white and pink. Temple orange, lime and lemon trees, growing actively, were killed back to the larger limbs.

Fruit injury was fairly consistent with tree injury. It was visible half an inch below the stem-end in more than fifty percent of the fruits, and varied from buckling of the walls of the flesh, with ruptured cells and air spaces, to complete drying and collapse of the structure. It was noticed that fruits taken from near the tops of trees were drier than those picked two or three feet from the bottom. Both grapefruit and oranges from trees having less than ninety percent of leaf-kill were of acceptable eating quality.

After completing the survey the members of the committee agreed that to the best of their knowledge certain practices should be followed in caring for freeze-injured citrus trees. Here are the recommendations.

Since it is too early yet (third week in February) to determine the full extent of damage in most cases, we urge the grower not to be in a hurry to remove loose bark from his trees. In many instances new bark is beginning to cover injured places and they will heal better without being disturbed. Some grapefruit trees may become infected with gummosis, but it is believed fewer trees will become infected if they are not disturbed for a while. It is suggested that no bark treatment be done until a further report from this committee is issued.

If the trees are small and were not banked and all bark is dead to the bud union, there is no chance of saving such trees and they might as well be pulled out and the field replanted. Trees which have the bark killed more than a third of the way around the trunk usually will not make satisfactory trees. The exact amount of dead bark cannot be determined at this time, but probably can be determined by the time pruning

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COPPER FUNGICIDE "53"

This ORTHO combination spray is highly effective and economical in use against the principal fungus diseases and most destructive insects that attack citrus fruits in the Gulf States. Basic Copper Sulfate and Superior Oil in exact proportions for positive control; less labor in handling.

The copper fungicide to use against melanose and scab. Combines with wettable sulfur — zinc sulfate where needed.

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operations should begin.

If the trees were banked and are dead to the bank, the dirt should be taken down a few inches, exposing a couple of inches of live wood all around the tree so that new shoots can come out from the live wood above the ground. The bank should be completely removed as soon as danger of freezing is past.

Pruning should not start until well after the new shoots have come out so that one can tell definitely what tissues have been killed and sufficient time has been allowed for those splits to heal over, that will heal over quickly.

The committee advises against the importation of citrus nursery stock from other areas because of the danger of introducing new diseases and insects. It is also recommended that the grower wait until fall to obtain any trees from the nursery, since by that time the amount of freeze damage on nursery stock should become apparent.

While no registered psorosis-free trees can be obtained for another two years, trees for replanting should, in so far as possible, be obtained from reliable nurserymen who are trying to eliminate the psorosis disease from their nursery stock.

CITRUS INSECT CONTROL PROBLEMS FOR THE SPRING OF 1949.

(Continued from Page 9)

in young groves and where it is important to save this spring's flush of growth, control measures should be taken.

Several materials are available for use, and any one should be satisfactory. Nicotine sulfate may be used at the regular recommendation of 1 to 800. Tetraethyl pyrophosphate is satisfactory and should be applied according to the manufacturers' recommendations. Parathion and benzene hexachloride are also good aphicides. Parathion should be applied at 1½ pounds of 15 percent material per 100 gallons. Benzene hexachloride is applied at 2 pounds of a 6 percent gamma material per 100 gallons of spray. Do not use either of these latter two materials after fruit has set. A thorough parathion spray will also reduce the scale population.

For more specific information and recommendations consult the Florida Citrus Experiment Station at Lake Alfred.

TREES, SHRUBS PLANTED

Many Bradford County home demonstration club women and 4-H club girls have planted fruit trees, roses azaleas, and camellias in their yards during the past month, according to Miss Dorothy Ross, home agent.

Better Living for a Better World is the theme of the 1949 National 4-H Club Week, March 5-13.

Taste-test Quality...

This year's early bloom indicates another bumper crop of fine "taste-test" quality fruit. A common sense summer fertilizer program, including organics and minerals*, applied early, will help toward early maturity and this **taste-test** quality.

There is no better fruit produced in Florida than that grown with NACO Brand Fertilizer!

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THE RELATIONSHIP OF TIMING POST-BLOOM SPRAYS ON CERTAIN FRUIT BLEMISHES ON ORANGES

(Continued from Page 8)

jury developed and the fruit had grown to a stage where it was more susceptible to spray injury.

No one type of blemish may be abundant, but the total amount of different kinds of blemishes caused by melanose, rust mite and spray injury may be the dominant factors causing a low grade of fruit. When either a proprietary copper-wettable sulfur spray or a copper-oil emulsion spray was applied during the first two weeks after the petal drop, wind scars were the only blemishes of any consequence, but where the sprays were delayed four to seven weeks after the petal drop, blemishes of all types increased.

Since star melanose results when melanose infection has occurred prior to the copper application, it is important to apply the post-bloom spray as soon after the petal fall as possible. Copper-mechanical injury was also more prevalent on the later post-bloom application.

Oil blotch has been definitely classified as an oil emulsion injury which develops on oranges when the application is made when the fruit is between 3/4 to 1½ inches in diameter. Copper-oil emulsion sprays should not be applied after the majority of the fruit is of a size that they are likely to be marked, nor should oil emulsions be applied too early in the summer for the same season. During years when the trees are late in blooming, crops of oranges may be marked by the late May or early June oil emulsion sprays. All of the various insecticide and fungicide combinations are necessary and effective for the production of bright fruit. Where it is necessary to check a heavy infestation of either purple scale or Florida red scale in the spring of the year, a copper-oil emulsion spray is very effective for controlling melanose and reducing the scale population until the summer oil spray, and also for controlling purple mites if they are present.

A general recommendation for the production of fruit free of blemishes caused by spray materials is to apply the post-bloom spray as soon as possible after the fruit has set. Where it takes over three weeks to spray the entire acreage, part of it could be sprayed with a dormant copper-wettable sulfur which would check an early infection of melanose on the young fruit. The early post-bloom spray should be applied on the section of the grove or groves which did not receive the dormant spray and the groves which were sprayed during the dormant period should be sprayed last. In 1948 star melanose was not a grade lowering factor where that type of program was followed. A copper-oil emulsion should not be used in delayed post-bloom spray even though a dormant copper application was made because oil blotch may develop.

Close rust mite inspection should be made three to four weeks following all forms of copper sprays, especially the copper-oil emulsion combinations. Rust mite infestations may still cause the early type of rust mite injury during June and July, which would lower the grade even though the post-bloom sprays were well timed.

THE COMPOSITION OF FLORIDA CITRUS MOLASSES

(Continued from page 15)

conditions in a steam-jacketed kettle. Before concentration the Brix was 9.3 degrees, the reducing sugars 2.94 per cent, and the total sugars 5.64 per cent. After concentration the corresponding values were 73.86 degrees, 23.74 per cent, and 44.55 per cent, respectively. Since the ratios of these constituents were nearly the same after concentration as before, it was concluded that the sugars change very little during the process. It is believed that the conditions in the laboratory were as severe as those encountered in commercial plants.

Protein. The crude protein values ranged from 3.35 to 4.15 per cent. While the amount present is significant, molasses must be classed as a low protein material.

Pectin. Pectin determinations by the alcohol precipitation method gave values ranging from 0.80 to 1.59 per cent. These quan-

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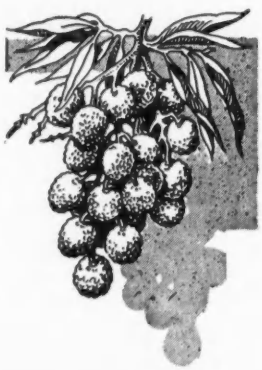

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tities of pectin probably contribute materially to the viscosity of the molasses. An effort was made to determine pectin acid by the official method but light-colored precipitates were never obtained and the values are not reported.

Acidity. Total acidity and pH are under the control of the operator by varying the amount of lime added. It is evident that most of the original acidity in the waste peel and pulp had been neutralized. The volatile acidity, as expected, was reduced to very low values by the concentration process.

Ash. The ash is due largely to the addition of lime to the peel and this is reflected in the high calcium values. Some magnesium was also found. Both of these elements are of value in the compounding of feeds.

Color. Most of the samples were quite dark in color, being brown to dark brown. Three of the samples, however, Nos. 3, 7, and 13, were lighter. The amount of suspended matter and degree of dispersion may be the principal factors in these differences in color. The small particles of pulp darken very little during the concentration process. The pH and ash values were in the same range and this ruled out the possibility of differences in degree of liming. Samples Nos. 3 and 7 were below the average in concentration, and sample No. 13 above the average.

Viscosity. The viscosity values are of interest in devising means and equipment for handling the citrus molasses. Values were obtained over the range of 77° to 176° F.; but no values are reported for temperatures lower than 77° F. because the instrument is not well-suited to solutions of the thickness encountered at those temperatures. As would be expected, the viscosity of each sample decreased rapidly with increase in temperature, but there was considerable variation among the samples. Some of this variation was due to the degree of concentration, sample No. 3 being the least concentrated as well as the least viscous. But since different samples of substantially the same concentration also showed substantial variations, probably the condition of the fruit, variety, time of the season, and method of preparation also affected the viscosity.

(Continued on page 22)

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Reports Of Our Field Men . . .

HILLSBOROUGH & PINELLAS COUNTIES

C. S. (Charlie) Little

We had a light rain on March 14th (now March 20th) but it didn't do very much good and we are now suffering from the drought all over the territory. Some growers are having trouble in getting water to irrigate as much as they would like, with the small lakes being pumped dry and those growers that have wells are having trouble with small supply and in some instances with water becoming salty. The movement of valencia oranges from this territory has been considerably curtailed for several reasons, but the main reason is the realization that we do not have as much of this variety of fruit as we at first thought. The valencia crop is all on the outside of the tree giving an appearance of more fruit than we can actually pick. We have some bloom making an appearance but it is very spotty with no bloom at all on groves that cannot be irrigated.

SOUTHWEST FLORIDA

Eaves Allison

Now that citrus prices have climbed back up to a profitable level we have a bad dry spell to complain about. There's always something, or else maybe we just look more on the bad side. The drought was broken to some extent on March 14th, with a thunderstorm that swept over most of this part of the state. Not really enough rain to do any good south of Ruskin, but rain nevertheless. Spring vegetable crops are advancing as well as can be expected under dry conditions and whipping winds. Tomatoes are suffering to a considerable extent from what has been tentatively identified as potato mosaic. Gladiola are of unusually good quality and in satisfactory supply. And speaking of citrus prices, the situation has done a complete about face. Before the freezes in Texas and California we were hoping to get back a portion of our production cost, but now we are talking about $2.00 valencia and $1.00 grapefruit. With the new price outlook growers are again planning to give their trees ample fertilizer to insure a good volume of fruit for the coming season.

POLK COUNTY

J. M. (Jim) Sample

Usually at this season of the year most growers are busy getting their spray program under way, and doing other jobs about the grove, but at present time everyone that has irrigation equipment is busy trying to keep some water flowing to their parched trees. Those growers that do not have irrigation are unable to spray because their trees are in severe wilted condition. Groves that have had water are blooming and looking good, but the unwatered properties are in a bad plight. It has been necessary to move a considerable tonnage of valencias and marsh seedless that would have ordinarily been held for later shipments, but due to drought the fruit was soft and had to be picked. Prices have held up well and there are some indications that they might even be better later in the season. Many groves in the ridge section will have to be pruned severely this summer to remove dead wood caused by dry weather. Our summer application of fertilizer will get under way just as soon as we have some rain and most growers are planning to use a well balanced mixture with ample amounts of secondary plant foods.

NORTH CENTRAL FLORIDA

V. E. (Val) Bourland

We are still having dry weather with hot days and cool nights, and many groves are suffering very badly. Our valencia crop in many instances are so dry that they cannot be picked for handling through the packing house. Late bloom valencias are dropping very excessively. We have some new growth now making an appearance and on this growth we have heavy infestations of aphis. Trees are blooming where we have been able to irrigate. There has been practically no spraying done to date as grove owners have been busy cultivating and watering. Cucumbers are looking good and beginning to set their crop and watermelon growers after worrying about frost during the middle of March are feeling better as they experienced very light damage, and their crops are now looking good considering the dry weather. Pastures are all dry with grass dying in many spots. We are wishing for rain.

WEST CENTRAL FLORIDA

E. A. (Mac) McCartney

In spite of the extremely dry weather that we have had for the past few months both vegetable and citrus growers have been successful in having normal crop production. Citrus groves are suffering in most cases where it was impossible to irrigate, but we have probably suffered less than some other sections. There has been heavy movements of fruit from this section in recent weeks to both the packing houses and the canneries, and it is now evident that fruit is getting scarce throughout the territory. Prices are very good and there is a great deal of activity among the on-the-tree buyers. In fact they are moving about more at this time than they have in the past two or three years. Growers are beginning to give thought to their summer application of fertilizer, and it now appears that we will get under way with this operation during the month of April and will be through by the middle or latter part of June. Vegetable crops, as a general rule, are in very good condition in spite of the drought, and most growers should realize a profit from their season operations.

SOUTH POLK, HIGHLANDS & HARDEE COUNTIES

R. L. (Bob) Padgett

The story in this territory at the present time is just about as we reported it last month. That is, dry weather, trees wilted, fruit soft and in general a very depressed condition because of a moisture deficiency since last November. There is a large acreage of grove property in this territory that is practically defoliated and in many cases much wood damage. With this condition it will be impossible for these badly damaged groves to get a heavy crop of fruit for the coming season. Those growers that have been able to irrigate have been busy at the job both night and day and are weary from the long hours that they have been working. Because of the drought the spring application of fertilizer was considerably curtailed, but if we can get a few good showers soon, the summer application will get under way and should be applied as soon as possible. The vegetable crops in Hardee County are looking fairly good in spite of the drought, but a rain would be of great value at this time.

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Seems like the weather man has sort of had it in for citrus producin' areas the past few months. California and Texas has had freezes that has cost their growers a lot of millions of dollars. Florida has been sufferin' a mighty bad drouth, and the whole citrus belt needs a good soakin' rain. A lot of Florida groves, 'specially in Polk, Highlands, Hardee and DeSoto counties won't be able to set a normal bloom even if we were to get a good rain now. This is mighty tough 'cause the crop for the coming season is affected and a lot of the fruit now on the trees is droppin' badly and a lot of it has got to be moved quickly before it gets too soft.

What with all the new and powerful insecticides and fungicides comin' on the market the Agricultural and Fungicide Association makes the followin' suggestions to their customers which sounds right sensible to us:

(1) Do some advance thinking about pest problems. Consider the possible insects or diseases in relation to specific crops or animals and their surroundings, (2) Select a reliable manufacturer as your source of supply and discuss your problems with an accredited representative. (3) Find out about the possibilities of secondary problems, such as residues and off-flavors, (4) Determine type of application equipment you will need and investigate the possibility of damage to neighboring crops from drift. (5) Be accurate with dosage. (6) If your food crop is intended for processing, discuss your control program with the food processing company. (7) Read labels and accompanying literature carefully. Read the warnings and directions—and obey them.

Sweet corn is gettin' to be a money crop in Florida. They say there is more than 12,000 acres of this crop planted in Peninsular Florida this spring. Plantings run all the way from the southern part of the state to the Georgia line. Ruskin planters started cuttin' their crop about the middle of March.

A great deal of interest continues in improved pastures. During the past few months there have been a large number of pasture tours held all over the state with experts from both the Experiment Station and Extension Service in attendance to advise with the cattlemen. The lack of rain has brought about serious damages to a large acreage of pasture land, but they will respond very rapidly when we do get some rain.

Governor Warren of California summed up the cold damage in his state by observing: "It's bad but it could have been worse."

Uncle Bill

THE COMPOSITION OF FLORIDA CITRUS MOLASSES

(Continued from page 19)

DISCUSSION

In comparing the values obtained with those which Nolte, von Loesecke and Pulley (12) obtained with citrus press juice, it is noted that the sugars constituted a smaller proportion of the total solids in the citrus molasses examined. The results of Nolte et al indicated 74 per cent of the solids in the press juice to be sugar. Recently in connection with investigations on feed yeast, numerous analyses were made on citrus press juice. Occasionally percentages of 75 per cent were obtained; but usually the values ranged from 50 to 70 per cent. When the lowest values were encountered it was thought probable that there had been some loss of sugars by fermentation in the peel bins or during storage of the press juice. Protein values of the press juice were about in the same proportion as in the molasses; pectin values were smaller with citrus molasses, possibly because of the adverse effect of the heating during concentration. Fixed acidity was somewhat lower with the molasses, and as would be expected, tests for volatile citrus peel oils in the molasses samples did not reveal detectable quantities by the usual methods.

TABLE I. Production of Dried Citrus Pulp and Citrus Molasses in Florida

Season	Dried Citrus Pulp	Citrus Molasses
1940-41	32,730 tons	0
1941-42	29,696 tons	2,500**
1942-43	47,376 tons	5,700**
1943-44	67,130 tons	14,496 tons
1944-45	68,724 tons	19,260 tons
1945-46	108,470 tons	44,168 tons
1946-47	96,914 tons	55,811 tons
1947-48	154,181 tons*	65,887 tons*

Data obtained from Citrus Processors Association, Inc., Tampa, Florida.
* Tentative
** Data from Office of Supply, War Food Administration.

SUMMARY

The chemical analyses of 13 samples of citrus molasses are presented. The average values obtained were: 71.37 degrees Brix by refractometer, 72.28 degrees Brix by spindle; 70.43 per cent total solids; 42.09 per cent total sugars; 22.44 per cent reducing sugars; 19.65 per cent non-reducing sugars; 3.81 per cent protein; 1.07 per cent pectin (alcohol precipitate); pH 4.68; 0.64 per cent total acidity as citric acid; 0.053 per cent volatile acidity as acetic acid; 4.77 per cent ash; 29.84 per cent calcium in ash; and 2.14 per cent magnesium in ash. Viscosities at temperatures ranging from 77° to 176° F. and Maerz and Paul color values are also given. The values obtained are in general agreement with those calculated from other data on the composition of citrus press juice from which the molasses is made. The material is high in carbohydrates and contains substantial quantities of crude protein and ash. Calcium comprises a major portion of the ash. The citrus molasses is similar in composition to blackstrap molasses made from cane and finds similar uses, particularly in the compounding of mixed feeds.

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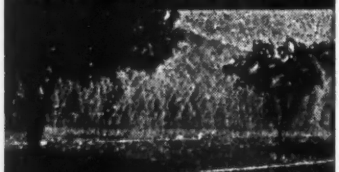

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